

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) **EP 0 591 585 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

- (45) Date of publication and mention of the grant of the patent:  
12.06.1996 Bulletin 1996/24

(51) Int Cl.<sup>6</sup>: **G08B 15/00, G08B 25/10**
- (21) Application number: **92309237.3**
- (22) Date of filing: **09.10.1992**

(54) **Remote monitoring unit**  
Fernüberwachungseinheit  
Unité de surveillance à distance

<div>(84) Designated Contracting States: <b>DE FR GB IT</b></div> <div>(43) Date of publication of application: <b>13.04.1994 Bulletin 1994/15</b></div> <div>(73) Proprietor: <b>Tanaka, Mutuo</b> <b>Tachikawa-Shi, Tokyo (JP)</b></div> <div>(72) Inventor: <b>Tanaka, Mutuo</b> <b>Tachikawa-Shi, Tokyo (JP)</b></div>	<div>(74) Representative: <b>Hackett, Sean James</b> <b>MARKS &amp; CLERK,</b> <b>57-60 Lincoln's Inn Fields</b> <b>London WC2A 3LS (GB)</b></div> <div>(56) References cited: <div><div><b>EP-A- 0 028 933</b></div><div><b>EP-A- 0 435 007</b></div><div><b>CH-A- 0 651 984</b></div><div><b>GB-A- 2 186 404</b></div></div></div>
--	--

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

**EP 0 591 585 B1**

1

EP 0 591 585 B1

2

**Description****BACKGROUND OF THE INVENTION****(1) Field of the Invention**

The present invention generally relates to a remote monitoring unit, and more particularly to a remote monitoring unit for monitoring the security of a remote site building from a central control equipment via radio transmission.

**(2) Description of the Prior Art**

Conventionally, a security control system has been utilized as a countermeasure, for preventing crimes and disasters in a building (or an office) whose security is to be monitored. Such a system is disclosed in GB 2 186 404, and generally includes a camera, a fire detecting sensor and other sensors installed at a remote site location to be monitored, and a central control equipment installed in a security corporation. A video signal output by the camera and detection signals output by the sensors are transmitted from the building to the central control equipment via a transmission cable linking the monitored building to the central control equipment.

In a case of the security control system of the type described above, a security personnel at a location of the central control equipment always monitors the security of a plurality of buildings by means of video signals and detection signals received from the remote site, and controls operations of cameras and sensors installed in the monitored buildings in a concentrated manner. It is known that a camera, a temperature sensor, a gas sensor and other sensors are used as surveillance sensors installed in the monitored buildings. The temperature sensor senses the occurrence of a fire at a monitored location by detecting a temperature change there higher than a prescribed level. The gas sensor senses the presence of smoke at the monitored location by detecting a concentration of a specific gas there greater than a prescribed level.

When the above described monitoring system is used for security purposes, it is necessary to separately install several surveillance sensors such as a camera and a temperature sensor at different locations of a remote site to be monitored. Also, it is necessary to separately install several telephone lines or cables for transmitting output signals of the respective surveillance sensors from the remote site building to the central control location. Separately made installations of the sensors and the transmission lines have been very troublesome. Thus, the installation of the security control system becomes expensive, as the system requires several surveillance sensors to be placed in the remote site building.

When a showroom of the building is monitored, several surveillance sensors of the above described secu-

urity control system must be placed at locations of the showroom; this is detrimental to the appearance of objects being displayed in the showroom. It is thus desirable that the surveillance sensors of the security control system are built so as to be compact and not detrimental to the appearance of the objects at the monitored locations.

**SUMMARY OF THE INVENTION**

Accordingly, it is a general object of the present invention to provide an improved remote monitoring apparatus in which the above described problems are eliminated.

Another and more specific object of the present invention is to provide a remote monitoring apparatus for use in a security control system, which apparatus includes a plurality of different surveillance sensors accommodated in an enclosure case and can be easily and inexpensively installed at a location of a monitored site with no undesired effects on the appearance of the monitored object. The above mentioned object of the present invention is achieved by a remote monitoring apparatus which includes a camera for producing a video signal from a picture of a remote site location being monitored, an image processor for outputting an image signal through an image processing process from the video signal produced by the camera, a microphone for producing a sound signal from a sound at the remote site location, a temperature sensor for outputting a detection signal when a temperature change higher than a predetermined level is detected at the remote site location, a gas sensor for outputting a detection signal when a concentration of oxygen gas smaller than a predetermined first level or a concentration of hydrogen gas greater than a predetermined second level is detected in the remote site location, a converter for outputting digital signals by converting the image signal of the image processor, the sound signal of the microphone, the detection signal of the temperature sensor, and the detection signal of the gas sensor, and a radio transmitter for transmitting the output digital signals of the converter to a radio receiver of a control equipment via radio transmission, the control equipment being capable of telecommunications of the output digital signals with a central control equipment via a public line. In this remote monitoring apparatus, the camera, the image processor, the microphone, the temperature sensor, the gas sensor, the converter, and the radio transmitter are built together in an enclosure case to form the remote monitoring apparatus, and the security of the remote site location is monitored from the central control equipment by placing the remote monitoring apparatus at the remote site location.

According to the remote monitoring unit of the present invention, several surveillance sensors are accommodated in the enclosure case, and it is not necessary to separately place the surveillance sensors and

the transmission lines therefor at locations of a remote site building to be monitored. Thus, the installation of the remote monitoring unit can be easily made at a low cost. The remote monitoring unit of the present invention is constructed as a one-piece unit, and no undesired effects result on the appearance of the monitored object when the unit is installed. In addition, the output signals of the surveillance sensors 3 through 6 are transmitted to the control center 7 via radio transmission, thus preventing the transmission of the signals from being inoperative when a fire occurs at the monitored location as in the conventional monitoring system which requires the installation of the transmission lines for transmitting the signals.

Other objects and further features of the present invention will become apparent from the following detailed description when read in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view showing a preferred embodiment of a remote monitoring unit according to the present invention;

FIG. 2 is a sectional view showing the remote monitoring unit shown in FIG. 1;

FIG. 3 is a perspective view showing the remote monitoring unit accommodated in a domed case; and

FIG. 4 is a block diagram showing a security control system which utilizes the remote monitoring unit according to the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

A description will now be given, with reference to FIGS. 1 through 3, of a preferred embodiment of a remote monitoring unit according to the present invention. FIGS. 1 and 2 show a remote monitoring unit according to the present invention which is used in a security control system. As shown in FIGS. 1 and 2, this remote monitoring unit 1 includes a case 2 for enclosing a black-and-white camera 3, a temperature sensor 4, a microphone 5, a gas sensor 6, an infrared lamp 28, a radio transmitter 12, and other component parts therein. The case 2 has an upper domed cover 2a and a lower base 2b, as shown in FIG. 3. FIGS. 1 and 2 show a condition of the remote monitoring unit when the upper domed cover 2a is removed from the lower base 2b.

The camera 3 of the remote monitoring unit 1 is a black-and-white, charged-coupled device (CCD) camera which utilizes solid-state image sensors to produce approximately 250 thousand picture elements. The picture receiving angle of the camera 3 is set to an angle of 120 degrees relative to a center line of the monitoring unit 1. The camera 3 having a relatively large height is arranged at an upper central portion of the remote monitoring unit 1 corresponding to the top center of the upper

domed cover 2a. In the remote monitoring unit 1 shown in FIG. 3, only a top portion of the camera 3 is exposed to the exterior, at the top of the upper domed cover 2a. The temperature sensor 4, the microphone 5, and the gas sensor 6, which are relatively small in height, are arranged at lower peripheral portions of the remote monitoring unit 1 corresponding to outer peripheral portions of the lower base 2b. The arrangement mentioned above allows the construction of a remote monitoring unit having a smaller height than in the prior art technology. The camera 3 generates a video signal providing a motion picture of a monitored location (e.g., an office or a showroom), and this signal is output to the radio transmitter 12 via an image processor 13 (shown in FIG. 4).

The infrared lamp 28 is provided in the vicinity of the camera 3 in order to project infrared light to the monitored location so that a clear picture of the monitored location can be taken by means of the black-and-white camera 3. The infrared light emitted by the infrared lamp 28 is invisible to the human eye. By means of the camera 3 and the infrared lamp 28, it is possible to pick up a picture of a very dark location so that the conditions of such a location may be monitored without bringing the remote monitoring unit to the attention of a person illegally entering the location. If a color camera is provided in the remote monitoring unit, it is necessary to illuminate the monitored location using a lamp which emits a visible light. However, if the color camera is used, together with such a lamp, a burglar entering the location would immediately notice the presence of the camera and the lamp. According to the monitoring unit of the present invention, the black-and-white camera 3 and the infrared lamp 28 are used together, and it is thus possible to pick up a picture of a monitored location without bringing the remote monitoring unit to the attention of a person entering the location. Thus, the security of the location can be effectively monitored.

The temperature sensor 4 of the remote monitoring unit 1 is a thermoelectric sensor which utilizes a platinum thermocouple for sensing a temperature change due to the heat of a person entering the monitored location. The temperature sensor 4 of this embodiment uses a plurality of heat wires (e.g. sixteen heat wires) to increase the accuracy of the temperature measurement. By means of this temperature sensor, it is possible to detect a temperature change (due to the heat of a person entering the monitored location) in the monitored location greater than a predetermined normal temperature level. Thus, when a burglar enters the monitored location wherein the temperature sensor 3 is in operation, the temperature sensor 3 outputs a detection signal to the radio transmitter 12 via an A/D converter 15 (shown in FIG. 4) of the remote monitoring unit 1.

Instead of the temperature sensor of the type mentioned above, an infrared sensor may also be used in the remote monitoring unit 1. The infrared sensor senses a change of infrared light effected when a heat source moves in a measurement area. Thus, by means of the

5

EP 0 591 585 B1

6

infrared sensor, a temperature change greater than a predetermined normal temperature level at the monitored location can also be sensed. Hence, it is possible to detect whether or not a person enters the monitored location by means of the infrared sensor as in the case of the above mentioned temperature sensor 4.

The microphone 5 of the remote monitoring unit 1 is a flat, non-directional microphone which can collect a sound in various areas of the monitored location. The microphone 5, during operation, generates a signal from a sound in the monitored location, and this signal is output to the radio transmitter 12 via the A/D converter 15 immediately when a sound is produced at the monitored location. The use of the flat microphone allows the construction of a compact, thin remote monitoring unit.

The gas sensor 6 is built in a one-piece form as shown in FIGS.1 and 2. The gas sensor 6 is made from a combination of a limited current type oxygen sensor and a thin-film type hydrogen sensor, so that it can detect whether or not a concentration of oxygen gas at the monitored location is smaller than a predetermined level, and detect whether or not a concentration of hydrogen gas at the monitored location is greater than a predetermined level. In this respect, it is known that if a fire occurs in a closed place, a concentration of hydrogen gas is increased and a concentration of oxygen gas is decreased even before carbon dioxide is increasingly produced due to the combustion reaction. Thus, by means of the gas sensor 6, early detection of a fire occurring at the monitored location can be achieved. When the gas sensor 6 detects occurrence of a fire at the monitored location, the gas sensor 6 outputs a detection signal to the radio transmitter 12 via the A/D converter 15.

In the remote monitoring unit 1 according to the present invention, the camera 3, the microphone 5, and the infrared lamp 28 are normally switched off and not in operation. When any abnormal condition (gas or heat) of the monitored location is detected by either the gas sensor 6 or the temperature sensor 4, the operations of the camera 3, the microphone 5, and the infrared lamp 28 are immediately commenced in response to the detection signal output by either the gas sensor 6 or the temperature sensor 4. Therefore, when the occurrence of a fire at the monitored location is detected by the gas sensor 6, the detection signal and the picture of the monitored location are transmitted by the radio transmitter 12 from the remote monitoring unit to a radio receiver of a control center via radio transmission. The above mentioned information is further transmitted from the control center to a central control equipment via a public line. The occurrence of a fire is then notified to an operator at the central control equipment by utilizing the picture signal and the detection signal, and he can view the picture of the monitored location displayed on a monitor of the central control equipment so as to check whether or not a fire has actually occurred at the monitored location. Accordingly, a countermeasure can be quickly taken in accordance with the causes and conditions of the fire

occurring therein or any person entering the monitored location. Also, erroneous detection of a fire or intruder due to a malfunction of the security control system can be discovered in advance.

The remote monitoring unit 1 includes the image processor 13 (shown in FIG.4), for receiving an image signal from the camera 3 and performing the image processing for the received image signal. It also includes the A/D converter 15 for receiving the signals from the sensors 4 through 6 and the image processor 13, to produce digital signals therefrom, and it includes a control part 30 (shown in FIG.4) for receiving the detection signals of the sensors 4 and 6 so as to control operations of the camera 3, the microphone 5 and the infrared lamp 28 in response to the detection signals being received. These circuits of the remote monitoring unit 1 are mounted on three printed circuit boards 8 through 10. The remote monitoring unit 1 of this embodiment having four surveillance sensors accommodated in the enclosure case 2 requires several electronic parts 11 for processing the output signals of these surveillance sensors. The electronic parts 11 are divided into three groups, and they are respectively arranged on the printed circuit boards 8 through 10.

As shown in FIG.2, the first printed circuit board 8 with the largest surface area is raised from the lower case 2b of the case 2, the second printed circuit board 9 with an intermediate surface area is raised from the first board 8, and the third printed circuit board 10 with a smallest surface area is raised from the second board 9. The printed circuit boards 8 through 10 on which the electronic parts 11 are mounted are thus arranged, and they are built on the case 2 such that peripheral portions of each of the boards 8 through 10 are in accordance with the configuration of the upper domed cover 2a. This arrangement also allows the construction of a compact, thin remote monitoring unit.

The radio transmitter 12 of the remote monitoring unit 1 transmits the output signals of the surveillance sensors 3 through 6 from the remote monitoring unit 1 to a control center 7 (shown in FIG.4) via radio transmission. The radio transmitter 12 has a built-in antenna 17 and is formed in a small-sized transmitter. As described above, the radio transmitter 12 is provided in the remote monitoring unit 1 at a peripheral portion of the lower base 2b which is located outside the printed circuit boards 8 through 10. This arrangement allows the construction of a compact, thin remote monitoring unit.

As described above, the remote monitoring unit 1 includes several surveillance sensors 3 through 6 accommodated in the case 1, and it is not necessary to separately install the sensors and the corresponding transmission lines at various locations of a remote site building to be monitored. Thus, the installation of the remote monitoring unit can be easily made at a low cost. The remote monitoring unit is constructed as a one-piece unit, and the unit installed at the remote site location is not detrimental to the appearance of a monitored

7

EP 0 591 585 B1

8

object. Also, the remote monitoring unit can be easily assembled and the manufacture can be made at a low cost.

It should be noted that the black-and-white camera 3, the microphone 5, and the infrared lamp 28 are not always in operation in the remote monitoring unit 1. The operations of the camera 3, the microphone 5, and the lamp 28 are commenced immediately when any person entering the monitored location is detected by the temperature sensor 4 or when a predetermined level of the concentration of hydrogen gas or oxygen gas is detected by the gas sensor 6. Thus, an increased life of each of these parts can be achieved, and the power required for the operations of the remote monitoring unit can be reduced because the camera 3, the infrared lamp 28, and the microphone 5, requiring a relatively large consumption of power, are less frequently driven.

Next, a more detailed description will be given of operations performed by the remote monitoring unit according to the present invention. FIG.4 shows the arrangement of a security control system which utilizes the remote monitoring unit according to the present invention. In FIG.4, those parts which are the same as corresponding parts shown in FIGS.1 and 2 are designated by the same reference numerals, as in the previous figures. As shown in FIG.4, the security control system includes at least a remote monitoring unit 1 as described above, a remote site control center 7 for receiving information from the monitoring unit 1 and transmitting the information, and a central control equipment 14 for receiving the information from the control center 7.

In general, the security control system to which the present invention is applied has a hierarchical structure including the central control equipment 14, a plurality of control centers 7, and a plurality of remote monitoring units 1. The central control equipment 14 is installed in, for example, a security corporation, and receives monitoring information from each of the control centers 7 and controls operations of the control centers 7. Each control center 7 is installed in, for example, a guard operation room of a remote site building to be monitored. The remote monitoring units 1 are respectively installed in compartment rooms of the remote site building. Each control center 7 in the guard operation room of the building receives monitoring information from each of the remote monitoring units 1 in the building, and transmits the received information from the remote site building to the central control equipment 14 of the guard corporation via a public line.

As shown in FIG.4, the remote monitoring unit also includes a control part 30 for controlling operations of the above described parts including the camera 3, the temperature sensor 4, the microphone 5, the gas sensor 6, the infrared lamp 28, the image processor 13, the A/D converter 15, and the radio transmitter 12. In the remote monitoring unit described above, only the temperature sensor 4 and the gas sensor 6 are normally in operation; the camera 3, the microphone 5 and the infrared lamp

28 are normally switched off and not in operation. When a temperature change greater than a predetermined level due to the heat of a person entering the monitored location or a fire occurring therein is detected by the temperature sensor 4, or when a concentration of oxygen gas smaller than a predetermined level, or a concentration of hydrogen gas greater than a predetermined level due to a fire occurring therein is detected by the gas sensor 6, the output signal of the temperature sensor 4 and/or the output signal of the gas sensor 6 are sent to the control part 30. Then, the control part 30 respectively switches on the camera 3, the microphone 5 and the infrared lamp 28 by sending a control signal to these parts 3, 5 and 28 in response to the output signal of the temperature sensor 4 or the output signal of the gas sensor 6. Thus, the operations of the camera 3, the infrared lamp 28, and the microphone 5 are commenced by the control part 30, so that the camera 3 takes a picture of the monitored location, the microphone 5 collects sound therein, and the infrared lamp 28 projects infrared light to the monitored location.

The image processor 13 of the remote monitoring unit 1 receives a picture of a monitored object picked up by the camera 3, performs an image processing for the received picture, and outputs a signal, indicating the picture of the monitored object, to the A/D converter 15. The output signal of each of the temperature sensor 4, the microphone 5 and the gas sensor 6 are also output to the A/D converter 15. The A/D converter 15 converts the output signals of the surveillance sensors to digital signals. The radio transmitter 12 transmits the digital image signal and the digital detection signals (which are received from the A/D converter 15) to the radio receiver 16 of the control center 7 via radio transmission. The radio transmitter 12 of the remote monitoring unit 1 includes a built-in antenna 17, and the radio receiver 16 of the control center 7 includes an antenna 18.

When digital signals from the remote monitoring unit 1 are received by the radio receiver 16 of the control center 7, the received digital signals are converted by a modem 19 into a signal form suitable for long-distance transmission. The modulated signals are transmitted from the control center 7 to the central control equipment 14 via a public line 23 (such as a telephone line). In the meantime, the digital signals received at the modem 19 are also sent to a D/A converter 20 of the control center 7, and the D/A converter 20 converts the received digital signals into analog signals. These analog signals are supplied from the converter 20 to a monitor 21 and an alarm unit 22. At the monitor 21, the picture of the monitored location taken by the camera 3 is displayed. The alarm unit 22 produces a suitable acoustic or visible alarm information in accordance with the received analog signal when the signal received from the remote monitoring unit 1 indicates the detection of any disaster or intruder at the monitored location.

When the signals from the remote monitoring unit 1 are received by the central control equipment 14 via the

public line 23, a modem 24 of the central control equipment 14 reconverts the received signals, and a converter 25 converts the signals into a suitable form. The converted signals from the converter 25 are then input to a host computer 26, and the corresponding monitoring information indicated by the received signals is stored in a storage medium of the host computer 26.

In the above described embodiment, the black-and-white camera 3, the temperature sensor 4, the microphone 5, the gas sensor 6, the image processor 13, and the infrared lamp 28 are all accommodated in the case 2. However, a remote monitoring unit including all these parts in the case 2 is not always necessary. For example, when an unmanned room into which no person will enter is to be monitored, it is not necessary to provide the microphone 5 in the remote monitoring unit 1. When the monitored location is not a dark place, it is not necessary to provide the black-and-white camera 3 and the infrared lamp 28 in the remote monitoring unit, or a color camera can be used instead.

Further, the present invention is not limited to the above described embodiment, and variations and modifications may be made without departing from the scope of the present invention.

#### Claims

1. A remote monitoring apparatus for monitoring security of a remote site location from a central control equipment via radio transmission, said remote monitoring apparatus comprising:

camera means (3) for producing a video signal from a picture of a remote site location being monitored;  
an image processor (13) for outputting an image signal through an image processing process for said video signal produced by said camera means;  
a microphone (5) for producing a sound signal from a sound at said location;  
a temperature sensor (4) for outputting a detection signal when a temperature change higher than a predetermined level is detected at said location;  
a gas sensor (6) for outputting a detection signal when a concentration of oxygen gas smaller than a predetermined first level or a concentration of hydrogen gas greater than a predetermined second level is detected in said location;  
a converter (15) for outputting digital signals by converting said image signal of said image processor, said sound signal of said microphone, said detection signal of said temperature sensor, and said detection signal of said gas sensor; and  
a radio transmitter (12) for transmitting said out-

put digital signals of said converter to a radio receiver of a control equipment via radio transmission, said control equipment being capable of telecommunications of said output digital signals with a central control equipment via a public line;

characterized in that said camera means (3), said image processor (13), said microphone (5), said temperature sensor (4), said gas sensor (6), said converter (15), and said radio transmitter (12) are built in an enclosure case (2) to form said remote monitoring apparatus (1), and the security of said remote site location is monitored from said central control equipment by placing said remote monitoring apparatus (1) at said remote site location.

2. A remote monitoring unit according to claim 1, characterized in that said camera means (3) and said microphone (5) are normally not in operation, and start operating when said detection signal is output by said temperature sensor (4) due to said temperature change.
3. A remote monitoring unit according to claim 1, characterized in that said camera means (3) and said microphone (5) are normally not in operation, and start operating when said detection signal is output by said gas sensor (6) due to either said concentration of said oxygen gas lower than the predetermined first level or said concentration of said hydrogen gas higher than the predetermined second level.
4. A remote monitoring unit according to claim 1, characterized in that said camera means (3) comprises a black-and-white camera, and an infrared lamp (28) provided in the vicinity of said black-and-white camera for projecting infrared light to said remote site location.
5. A remote monitoring unit according to claim 1, characterized in that said enclosure case (2) includes an upper domed cover (2a) and a lower base (2b), and said camera means (3) includes a black-and-white camera utilizing a number of solid-state image sensors, said camera being arranged at an upper central portion of said case whose location corresponds to a top central portion of said upper domed cover (2a), said temperature sensor (4), said microphone (5) and said gas sensor (6) being arranged at lower peripheral portions of said case, said lower peripheral portions having locations corresponding to outer peripheral portions of said lower base (2b).
6. A remote monitoring unit according to claim 1, characterized in that said gas sensor (6) is formed with an oxygen sensor and a hydrogen sensor, said ox-

11

EP 0 591 585 B1

12

ygen sensor detecting whether or not a concentration of oxygen gas in said remote site location is smaller than said predetermined first level due to a fire occurring therein, and said hydrogen sensor detecting whether or not a concentration of hydrogen gas in said remote site location is greater than said predetermined second level due to a fire occurring therein, a detection signal thus being output to said converter (15) when said concentration of said oxygen gas is smaller than said predetermined first level, or when said concentration of said hydrogen gas is greater than said predetermined second level.

#### Patentansprüche

1. Fernüberwachungsvorrichtung zum Überwachen der Sicherheit einer abgelegenen Örtlichkeit von einer zentralen Kontrollanlage aus über Funkübertragung, wobei die genannte Fernübertragungsvorrichtung die folgenden Merkmale aufweist:

Kameramittel (3) zum Erzeugen eines Videosignals aus einem Bild einer abgelegenen Örtlichkeit, die überwacht wird;

einen Bildprozessor (13) zum Ausgeben eines Bildsignals durch einen Bildverarbeitungsvorgang für das Videosignal, das von den Kameramitteln erzeugt wurde;

ein Mikrophon (5) zum Erzeugen eines akustischen Signals aus einem Geräusch an der Örtlichkeit;

einen Temperaturfühler (4) zum Ausgeben eines Erfassungssignals, wenn eine Temperaturänderung, die höher ist als ein vorbestimmtes Niveau, an der Örtlichkeit erfaßt wird;

einen Gasfühler (6) zum Ausgeben eines Erfassungssignales, wenn eine Konzentration an Sauerstoffgas, die kleiner ist als ein vorbestimmtes erstes Niveau, oder eine Konzentration an Wasserstoffgas, die größer ist als ein vorbestimmtes zweites Niveau, an der Örtlichkeit erfaßt wird;

einen Wandler (15) zum Ausgeben von digitalen Signalen durch Umwandeln des Bildsignals des Bildprozessors, des akustischen Signals des Mikrophons, des Erfassungssignals des Temperaturfühlers und des Erfassungssignals des Gasfühlers; und

einen Funksender (12) zum Senden der digitalen Ausgabesignale des Wandlers an einen Funkempfänger einer Kontrollanlage über Funkübertragung, wobei die Kontrollanlage zu einer Fernmeldeübermittlung der digitalen Ausgabesignale an eine zentrale Kontrollanlage über eine öffentliche Leitung imstande ist,

dadurch gekennzeichnet, daß die Kameramittel (3), der Bildprozessor (13), das Mikrophon (5), der Temperaturfühler (4), der Gasfühler (6), der Wandler (15) und der Funksender (12) in ein Außengehäuse (2) eingebaut sind, um die Fernübertragungsvorrichtung (1) zu bilden, und daß die Sicherheit der abgelegenen Örtlichkeit von der zentralen Kontrollanlage her dadurch überwacht wird, daß man die Fernüberwachungsvorrichtung (1) an der abgelegenen Örtlichkeit aufstellt.

2. Fernüberwachungseinheit nach Anspruch 1, dadurch gekennzeichnet, daß die Kameramittel (3) und das Mikrophon (5) sich normalerweise nicht im Betrieb befinden und mit dem Betrieb beginnen, wenn das Erfassungssignal vom Temperaturfühler (4) infolge der Temperaturänderung ausgegeben wird.
3. Fernüberwachungseinheit nach Anspruch 1, dadurch gekennzeichnet, daß die Kameramittel (3) und das Mikrophon (5) sich normalerweise nicht im Betrieb befinden und mit dem Betrieb beginnen, wenn das Erfassungssignal vom Gasfühler (6) entweder infolge des Umstandes, daß die Konzentration des Sauerstoffgases niedriger ist als das vorbestimmte erste Niveau, oder infolge des Umstandes, daß die Konzentration des Wasserstoffgases höher ist als das vorbestimmte zweite Niveau, ausgegeben wird.
4. Fernüberwachungseinheit nach Anspruch 1, dadurch gekennzeichnet, daß die Kameramittel (3) eine Schwarz-Weiß-Kamera umfassen, und daß eine Infrarotlampe (28) in der Nähe der Schwarz-Weiß-Kamera vorgesehen ist, um Infrarotlicht an die abgelegene Örtlichkeit abzustrahlen.
5. Fernüberwachungseinheit nach Anspruch 1, dadurch gekennzeichnet, daß das Außengehäuse (2) eine obere, kuppelförmige Abdeckung (2a) und einen unteren Sockel (2b) umfaßt, und daß die Kameramittel (3) eine Schwarz-Weiß-Kamera umfassen, die eine Anzahl monolithischer Bildfühler benutzt, wobei die Kamera an einem oberen mittigen Abschnitt des Gehäuses angeordnet ist, dessen Lage dem obersten mittleren Abschnitt der oberen kuppelförmigen Abdeckung (2a) entspricht, und wobei der Temperaturfühler (4), das Mikrophon (5) und der Gasfühler (6) an unteren Umfangsabschnitten des Gehäuses angeordnet sind, wobei die unteren Umfangsabschnitte Lagen aufweisen, die den äußeren Umfangsabschnitten des unteren Sockels (2b) entsprechen.
6. Fernüberwachungseinheit nach Anspruch 1, dadurch gekennzeichnet, daß der Gasfühler (6) mit einem Sauerstofffühler und einem Wasserstofffühler

ausgebildet ist, wobei der Sauerstofffühler den Umstand erfaßt, ob eine Konzentration an Sauerstoffgas an der abgelegenen Örtlichkeit infolge eines Feuers, das an dieser auftritt, kleiner ist als ein vorbestimmtes erstes Niveau oder nicht, und wobei der Wasserstofffühler den Umstand erfaßt, ob eine Konzentration an Wasserstoffgas an der abgelegenen Örtlichkeit infolge eines Feuers, das in dieser auftritt, größer ist als das zweite Niveau oder nicht, und wobei somit ein Erfassungssignal an den Wandler (15) ausgegeben wird, wenn die Konzentration des Sauerstoffgases kleiner ist als das vorbestimmte erste Niveau oder wenn die Konzentration des Wasserstoffgases größer ist als das vorbestimmte zweite Niveau.

Revendications

1. Dispositif de surveillance à distance pour surveiller la sécurité d'un emplacement de site éloigné à partir d'un équipement de commande central par transmission radio, ledit dispositif de surveillance à distance comprenant:

un moyen de caméra (3) pour produire un signal vidéo à partir d'une image d'un emplacement de site éloigné surveillé;  
un processeur d'image (13) pour émettre un signal d'image à travers un processus de traitement d'image pour ledit signal vidéo produit par ledit moyen de caméra;  
un microphone (5) pour produire un signal sonore à partir d'un son dans ledit emplacement;  
un capteur de température (4) pour émettre un signal de détection en cas de détection d'un changement de température supérieur à un niveau prédéterminé dans ledit emplacement;  
un détecteur de gaz (6) pour émettre un signal de détection en cas de détection d'une concentration en oxygène inférieure à un premier niveau prédéterminé ou d'une concentration en hydrogène gazeux supérieure à un deuxième niveau prédéterminé dans ledit emplacement;  
un convertisseur (15) pour émettre des signaux numériques par conversion dudit signal d'image dudit processeur d'image, dudit signal sonore dudit microphone, dudit signal de détection dudit capteur de température et dudit signal de détection dudit détecteur de gaz; et  
un émetteur radio (12) pour transmettre lesdits signaux numériques émis par ledit convertisseur audit récepteur radio d'un équipement de commande par transmission radio, ledit équipement de commande pouvant assurer une télétransmission desdits signaux numériques émis vers l'équipement de commande central par une ligne publique;

caractérisé en ce que ledit moyen de caméra (3), ledit processeur d'image (13), ledit microphone (5), ledit capteur de température (4), ledit détecteur de gaz (6), ledit convertisseur (15) et ledit émetteur radio (12) sont montés dans un boîtier fermé (2) pour constituer ledit dispositif de surveillance à distance (1), la sécurité dudit emplacement de site éloigné étant surveillée à partir dudit équipement de commande central par installation dudit dispositif de surveillance à distance (1) dans ledit emplacement du site éloigné.

2. Unité de surveillance à distance selon la revendication 1, caractérisée en ce que ledit moyen de caméra (3) et ledit microphone (5) sont normalement hors service et sont mis en service lors de l'émission dudit signal de détection par ledit capteur de température (4) par suite dudit changement de température.
3. Unité de surveillance à distance selon la revendication 1, caractérisée en ce que ledit moyen de caméra (3) et ledit microphone (5) sont normalement hors service et sont mis en service lors de l'émission dudit signal de détection par ledit détecteur de gaz (6) par suite de la détection d'une dite concentration en oxygène inférieure au premier niveau prédéterminé ou d'une dite concentration en hydrogène gazeux supérieure au deuxième niveau prédéterminé.
4. Unité de surveillance à distance selon la revendication 1, caractérisée en ce que ledit moyen de caméra (3) comprend une caméra noir et blanc, une lampe infrarouge (28) étant agencée au voisinage de ladite caméra noir et blanc pour projeter la lumière infrarouge sur ledit emplacement du site éloigné.
5. Unité de surveillance à distance selon la revendication 1, caractérisée en ce que ledit boîtier fermé (2) englobe un couvercle supérieur bombé (2a) et une base inférieure (2b), ledit moyen de caméra (3) englobant une caméra noir et blanc utilisant un certain nombre de capteurs d'image à semi-conducteurs, ladite caméra étant agencée au niveau d'une partie centrale supérieure dudit boîtier, dont l'emplacement correspond à une partie centrale de sommet dudit couvercle supérieur bombé (2a), ledit capteur de température (4), ledit microphone (5) et ledit détecteur de gaz (6) étant agencés au niveau de parties périphériques inférieures dudit boîtier, lesdites parties périphériques inférieures se trouvant en des emplacements correspondant aux parties périphériques externes de ladite base inférieure (2b).
6. Unité de surveillance à distance selon la revendication 1, caractérisée en ce que ledit détecteur de gaz (6) comporte un détecteur d'oxygène et un détecteur d'hydrogène. ledit détecteur d'oxygène détec-



15

EP 0 591 585 B1

16

tant si une concentration en oxygène gazeux dans  
ledit emplacement du site éloigné est inférieure ou  
non audit premier niveau prédéterminé par suite  
d'un incendie, et ledit détecteur d'hydrogène détec- 5  
tant si une concentration en hydrogène gazeux  
dans ledit emplacement du site éloigné est supé-  
rieure ou non audit deuxième niveau prédéterminé,  
par suite d'un incendie, un signal de détection étant  
ainsi transmis audit convertisseur (15) lorsque ladi- 10  
te concentration en oxygène gazeux est inférieure  
audit premier niveau prédéterminé ou lorsque ladite  
concentration en hydrogène gazeux est supérieure  
audit deuxième niveau prédéterminé.

15

20

25

30

35

40

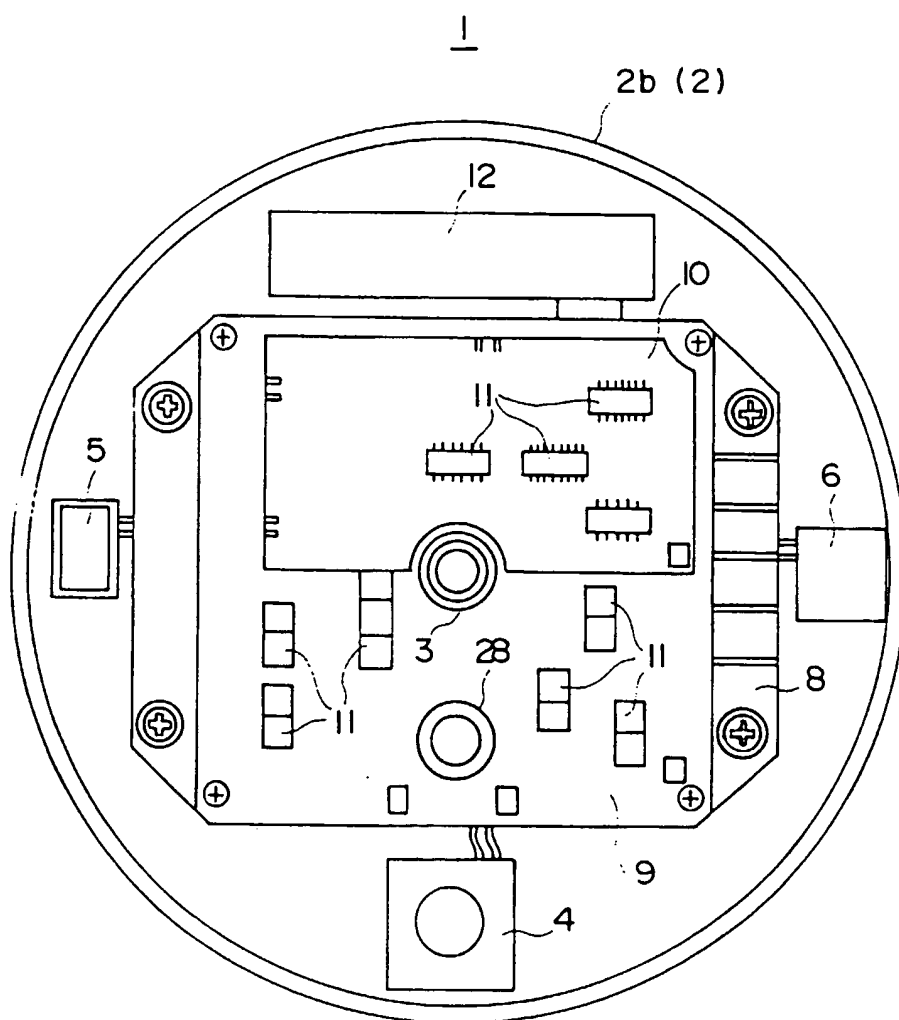
45

50

55

EP 0 591 585 B1

FIG. 1



EP 0 591 585 B1

FIG. 2

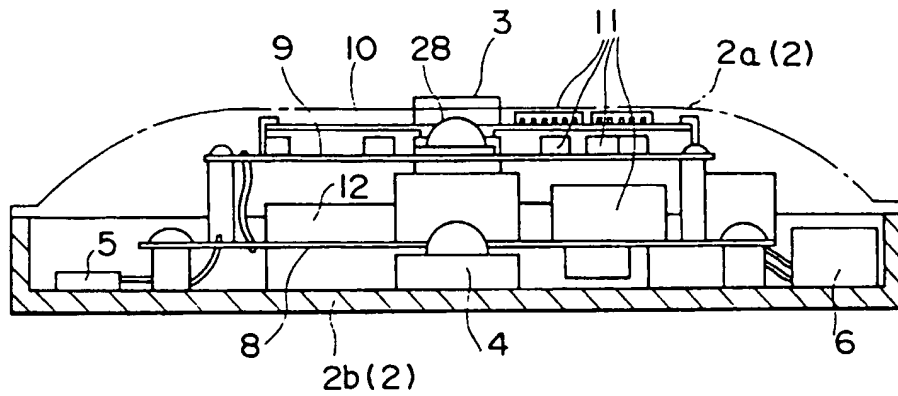
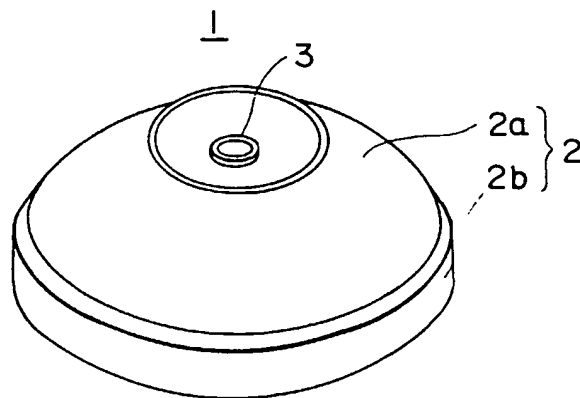


FIG. 3



EP 0 591 585 B1

FIG. 4

